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(54) **COMPONENT CARRIER WITH EMBEDDED COMPONENT ON STEPPED METAL STRUCTURE WITH CONTINUOUSLY FLAT BOTTOM SURFACE IN AT LEAST ONE HORIZONTAL DIMENSION**

(57) A component carrier (100) which comprises a stack (102) comprising at least one electrically conductive layer structure (104), at least one electrically insulating layer structure (106) and a cavity (108) delimited at a bottom side at least partially by a top side of a stepped metal structure (112) of the at least one electrically con-

ductive layer structure (104), and a component (114) embedded in the cavity (108) and arranged on the stepped metal structure (112), wherein a bottom side of the stepped metal structure (112) has a flat surface (116) extending continuously along at least one horizontal direction.

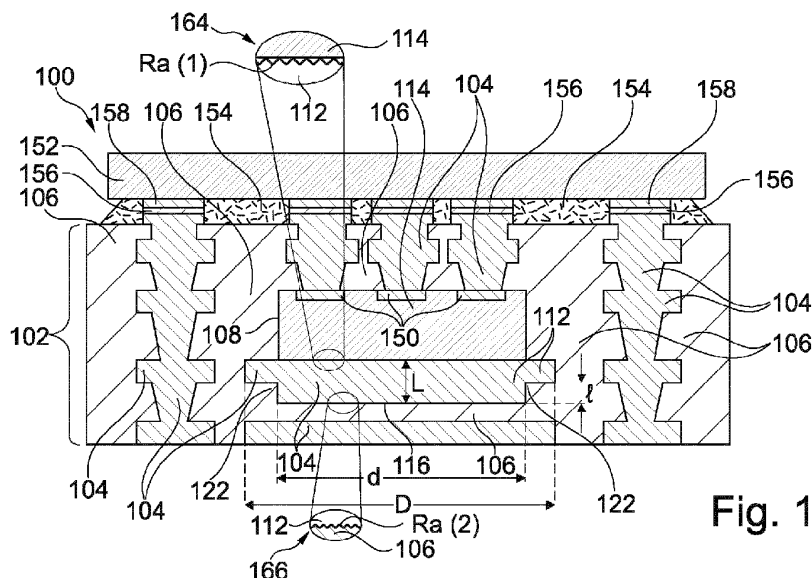


Fig. 1



EUROPEAN SEARCH REPORT

Application Number

EP 22 19 8479

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2018/233429 A1 (YOSUI KUNIAKI [JP] ET AL) 16 August 2018 (2018-08-16)	1-3, 5-7, 9-11	INV. H05K1/18
Y	* paragraphs [0062] - [0090]; figure 7 * -----	2, 4, 8	H01L23/538
X	US 2012/126399 A1 (LIN CHARLES W C [SG] ET AL) 24 May 2012 (2012-05-24)	1-3, 5-7, 11	ADD. H05K1/02
Y	* paragraphs [0048] - [0106]; figure 5 * -----	2, 4, 8	
X	US 2016/005673 A1 (STANDING MARTIN [AT] ET AL) 7 January 2016 (2016-01-07)	1-3, 5-7, 11	
Y	* paragraphs [0050] - [0066]; figure 5 *	2, 4, 8	
Y	& US 2020/185332 A1 (SUGIYAMA YUICHI [JP] ET AL) 11 June 2020 (2020-06-11)	2, 4, 8	
	* paragraph [0033] * -----		
			TECHNICAL FIELDS SEARCHED (IPC)
			H05K H01L
The present search report has been drawn up for all claims			

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EPO FORM 1503 03.82 (P04C01)

Place of search

The Hague

Date of completion of the search

2 February 2023

Examiner

Degroote, Bart

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
 Y : particularly relevant if combined with another document of the same category
 A : technological background
 O : non-written disclosure
 P : intermediate document

T : theory or principle underlying the invention
 E : earlier patent document, but published on, or after the filing date
 D : document cited in the application
 L : document cited for other reasons

& : member of the same patent family, corresponding document



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-11

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11**Component carrier with roughened stepped metal structure**
---**2. claims: 12-15****Method of manufacturing a component carrier comprising the step of forming a cavity in a stack comprising at least one electrically conductive layer structure and at least one electrically insulating layer structure, the cavity being delimited at a bottom side at least partially by a top side of a stepped metal structure of the at least one electrically conductive layer structure**

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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